What is claimed is:

1. A light source to provide illumination for a scene for a backscatter absorption gas imaging system comprising:

a light-generating device producing light at more than one wavelength;

an optical fiber amplifier having a gain medium and at least one pump laser with an output, where each of said at least one pump laser is an air-cooled pump laser having an operating temperature at an ambient temperature, where said optical fiber amplifier accepts light from said light generating device and produces amplified light at said more than one wavelength, and where the absorption of the output of said pump laser by said gain medium varies by no more than about 10% over a range of ambient temperatures of from about 0 C to about 40 C; and

a nonlinear frequency converter including an optical parametric oscillator (OPO) to accept said amplified light and generate an output of the light source at wavelengths shifted from and corresponding to each of said more than one wavelength.

2. The light source of claim 1, wherein said light-generating device produces continuous-wave light.

3. The light source of claim 1, wherein said light-generating device produces quasi-continuous-wave light, where said quasi-continuous-wave light has a repetition rate greater than about 10 kHz.

4. The light source of claim 1, wherein said light-generating device is a multi-longitudinal-mode laser.

5. The light source of claim 4, wherein said laser is a Nd:YAG laser.

6. The light source of claim 1, wherein said light-generating device is laser diode.

7. The light source of claim 1, wherein said light-generating device is fiber laser.

8. The light source of claim 1, wherein said light-generating device includes two or more light-generating devices; and further including a switch to select light from one of said two or more light-generating devices for acceptance by said optical fiber amplifier.

9. The light source of claim 1, wherein said light-generating device produces wavelength tunable light.

10. The light source of claim 9, wherein said wavelength tunable light is tunable between two wavelengths.

11. The light source of claim 1, wherein said optical fiber amplifier is a Yb-doped, tapered fiber amplifier.

12. The light source of claim 11, wherein said pump laser wavelength is near 915 nm.

13. The light source of claim 1, wherein said OPO has a cavity that tunably adjusts said wavelength output.

14. The light source of claim 1, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, and wherein said OPO is singly resonant at the wavelength of either said signal beam or of said idler beam.

15. The light source of claim 1, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, and wherein said OPO is doubly resonant at the wavelength of said signal beam and at the wavelength of said idler beam.

16. The light source of claim 1, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, further including optics to provide said idler beam as said adjustable wavelength output.

17. A light source to provide illumination for a scene for a backscatter absorption gas imaging system comprising:

a light-generating device producing light at more than one wavelength;

an optical fiber amplifier to accept light from said light-generating device and produce amplified light at said more than one wavelength, wherein said optical fiber amplifier is a Yb-doped, tapered optical fiber amplifier; and

a nonlinear frequency converter including an optical parametric oscillator (OPO) to accept said amplified light and generate an output of the light source at wavelengths shifted from and corresponding to each of said more than one wavelength.

18. The light source of claim 17, wherein said light-generating device produces continuous-wave light.

19. The light source of claim 17, wherein said light-generating device produces quasi-continuous-wave light, where said quasi-continuous-wave light has a repetition rate greater than about 10 kHz.

20. The light source of claim 17, wherein said light-generating device is a multi-longitudinal-mode laser.

21. The light source of claim 20, wherein said laser is a Nd:YAG laser.

22. The light source of claim 17, wherein said light-generating device is a laser diode.

23. The light source of claim 17, wherein said light-generating device is a fiber laser.

24. The light source of claim 17, wherein said light-generating device includes two or more light-generating devices; and further including a switch to select light from one of said two or more light-generating devices for acceptance by said optical fiber amplifier.

25. The light source of claim 17, wherein said light-generating device produces wavelength tunable light.

26. The light source of claim 25, wherein said wavelength tunable light is tunable between two wavelengths.

27. The light source of claim 17, wherein said optical fiber amplifier includes at least one pump laser with an output of near 915 nm.

28. The light source of claim 17, wherein said OPO has a cavity that tunably adjusts said wavelength output.

29. The light source of claim 17, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, and wherein said OPO is singly resonant at the wavelength of either said signal beam or of said idler beam.

30. The light source of claim 17, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, and wherein said OPO is doubly resonant at the wavelength of said signal beam and at the wavelength of said idler beam.

31. The light source of claim 17, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, further including optics to provide said idler beam as said adjustable wavelength output.

32. The light source of claim 17, wherein said optical fiber amplifier includes at least one pump laser and a gain medium, and wherein each of said at least one pump laser is an air-cooled pump laser having an operating temperature at an ambient temperature.

33. The light source of claim 32, wherein said air-cooled pump laser has an operating temperature at an ambient temperature, and wherein the absorption of the output of said pump laser by said gain medium varies by no more than about 10% over a range of said ambient temperatures of from about 0 C to about 40 C.

34. A light source to provide illumination for a scene for a backscatter absorption gas imaging system comprising:

two or more light-generating devices each producing light at more than one wavelength;

a switch to select light from one of said two or more light-generating devices;

an optical fiber amplifier to accept said selected light and produce amplified light at the more than one wavelength of said selected light; and

an optical parametric oscillator (OPO) to accept said amplified light and generate an output of the light source at wavelengths shifted from and corresponding to each of said more than one wavelength.

35. The light source of claim 34, wherein said light-generating device produces continuous-wave light.

36. The light source of claim 34, wherein said light-generating device produces quasi-continuous-wave light, where said quasi-continuous-wave light has a repetition rate greater than about 10 kHz.

37. The light source of claim 34, wherein at least one of said two or more light-generating devices is a multi-mode laser.

38. The light source of claim 37 , wherein said laser is a Nd:YAG laser.

39. The light source of claim 34, wherein at least one of said two or more light-generating devices is a laser diode.

40. The light source of claim 34, wherein at least one of said two or more light-generating devices produces tunable light.

41. The light source of claim 34, wherein said optical fiber amplifier is a Yb-doped, tapered fiber amplifier.

42. The light source of claim 34, wherein said optical fiber amplifier includes at least one pump laser with an output of near 915 nm.

43. The light source of claim 34, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, and wherein said OPO is singly resonant at the wavelength of either said signal beam or of said idler beam.

44. The light source of claim 34, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, and wherein said OPO is doubly resonant at the wavelength of said signal beam and at the wavelength of said idler beam.

45. The light source of claim 34, wherein said OPO, having accepted said amplified

light, generates a signal beam and an idler beam, further including optics to provide said idler beam as said adjustable wavelength output.

46. A light source to provide illumination for a scene for a backscatter absorption gas imaging system comprising:

a diode-pumped fiber laser producing an output of light at more than one wavelength, where said diode-pumped fiber laser is an air-cooled laser having an operating temperature at an ambient temperature, and where said output varies with temperature; and

a nonlinear frequency converter including an optical parametric oscillator (OPO) to accept said output and generate an output of the light source at wavelengths shifted from and corresponding to each of said more than one wavelength;

where said diode-pumped fiber laser is sufficiently air-cooled to provide an output that varies by no more than 10% over an ambient temperature range of from about 0 C to about 40 C.

47. A backscatter absorption gas imaging system for imaging a gas between the system and a scene, comprising:

a light source to generate an output for illuminating said scene, including

a light-generating device producing light at more than one wavelength,

an optical fiber amplifier having a gain medium and at least one pump laser with an output, where each of said at least one pump laser is an air-cooled pump laser having an operating temperature at said ambient temperature, where said optical fiber amplifier accepts light from said light generating device and produces amplified light at said more than one wavelength, and where the absorption of the output of said pump laser by said gain medium varies by no more than about 10% over an ambient temperature range of from about 0 C to about 40 C; and

a nonlinear frequency converter including an optical parametric oscillator (OPO) to accept said amplified light and generate an output of the light source at wavelengths shifted from and corresponding to each of said more than one wavelength; and

a camera responsive to backscattered illumination by said light source.

48. The backscatter absorption gas imaging system of claim 47, wherein said light-generating device produces continuous-wave light.

49. The backscatter absorption gas imaging system of claim 47, wherein said light-generating device produces quasi-continuous-wave light, where said quasi-continuous-wave light has a repetition rate greater than about 10 kHz.

50. The backscatter absorption gas imaging system of claim 47, wherein said light-generating device is a multi-longitudinal-mode laser.

51. The backscatter absorption gas imaging system of claim 50, wherein said laser is a Nd:YAG laser.

52. The backscatter absorption gas imaging system of claim 47, wherein said light-generating device is laser diode.

53. The backscatter absorption gas imaging system of claim 47, wherein said light-generating device is fiber laser.

54. The backscatter absorption gas imaging system of claim 47, wherein said light-generating device includes two or more light-generating devices; and

further including a switch to select light from one of said two or more light-generating devices for acceptance by said optical fiber amplifier.

55. The backscatter absorption gas imaging system of claim 47, wherein said light-generating device produces wavelength tunable light.

56. The backscatter absorption gas imaging system of claim 55, wherein said wavelength tunable light is tunable between two wavelengths.

57. The backscatter absorption gas imaging system of claim 47, wherein said optical fiber amplifier is a Yb-doped, tapered fiber amplifier.

58. The backscatter absorption gas imaging system of claim 57, wherein said pump laser wavelength is near 915 nm.

59. The backscatter absorption gas imaging system of claim 47, wherein said OPO has a cavity that tunably adjusts said wavelength output.

60. The backscatter absorption gas imaging system of claim 47, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, and wherein said OPO is singly resonant at the wavelength of either said signal beam or of said idler beam.

61. The backscatter absorption gas imaging system of claim 47, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, and wherein said OPO is doubly resonant at the wavelength of said signal beam and at the wavelength of said idler beam.

62. The backscatter absorption gas imaging system of claim 47, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, further including optics to provide said idler beam as said adjustable wavelength output.

63. A backscatter absorption gas imaging system for imaging a gas between the system and a scene, comprising:

a light source to generate an output for illuminating said scene, including

a light-generating device producing light at more than one wavelength,

an optical fiber amplifier to accept light from said light-generating device and produce amplified light at said more than one wavelength, wherein said optical fiber amplifier is a Yb-doped, tapered optical fiber amplifier, and

a nonlinear frequency converter including an optical parametric oscillator (OPO) to accept said amplified light and generate an output of the light source at wavelengths shifted from and corresponding to each of said more than one wavelength; and

a camera responsive to backscattered illumination by said light source.

64. The backscatter absorption gas imaging system of claim 63, wherein said light-generating device produces continuous-wave light.

65. The backscatter absorption gas imaging system of claim 63, wherein said light-generating device produces quasi-continuous-wave light, where said quasi-continuous-wave light has a repetition rate greater than about 10 kHz.

66. The backscatter absorption gas imaging system of claim 63, wherein said light-generating device is a multi-longitudinal-mode laser.

67. The backscatter absorption gas imaging system of claim 66, wherein said laser is a Nd:YAG laser.

68. The backscatter absorption gas imaging system of claim 63, wherein said light-generating device is a laser diode.

69. The backscatter absorption gas imaging system of claim 63, wherein said light-

generating device is a fiber laser.

70. The backscatter absorption gas imaging system of claim 63, wherein said light-generating device includes two or more light-generating devices; and further including a switch to select light from one of said two or more light-generating devices for acceptance by said optical fiber amplifier.

71. The backscatter absorption gas imaging system of claim 63, wherein said light-generating device produces wavelength tunable light.

72. The backscatter absorption gas imaging system of claim 71, wherein said wavelength tunable light is tunable between two wavelengths.

73. The backscatter absorption gas imaging system of claim 63, wherein said optical fiber amplifier includes at least one pump laser with an output of near 915 nm.

74. The backscatter absorption gas imaging system of claim 63, wherein said OPO has a cavity that tunably adjusts said wavelength output.

75. The light source of claim 63, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, and wherein said OPO is singly resonant at the wavelength of either said signal beam or of said idler beam.

76. The backscatter absorption gas imaging system of claim 63, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, and wherein said OPO is doubly resonant at the wavelength of said signal beam and at the wavelength of said idler beam.

77. The backscatter absorption gas imaging system of claim 63, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, further including optics to provide said idler beam as said adjustable wavelength output.

78. The backscatter absorption gas imaging system of claim 63, wherein said optical fiber amplifier includes at least one pump laser, and wherein each of said at least one pump laser is an air-cooled pump laser.

79. The backscatter absorption gas imaging system of claim 78, wherein said air-cooled pump laser has an operating temperature at an ambient temperature, and wherein the absorption of the output of said pump laser by said gain medium varies by no more than about 10% over an ambient temperature range of from about 0 C to about 40 C.

80. A backscatter absorption gas imaging system for imaging a gas between the

system and a scene, comprising:

a light source to generate an output for illuminating said scene, including

two or more light-generating devices each producing continuous-wave light at more than one wavelength;

a switch to select light from one of said two or more light-generating devices;

an optical fiber amplifier to accept said selected light and produce amplified light at the more than one wavelength of said selected light; and

an optical parametric oscillator (OPO) to accept said amplified light and generate an output of the light source at wavelengths shifted from and corresponding to each of said more than one wavelength; and

a camera responsive to backscattered illumination by said light source.

81. The backscatter absorption gas imaging system of claim 80, wherein said light-generating device produces continuous-wave light.

82. The light source of claim 80, wherein said light-generating device produces quasi-continuous-wave light, where said quasi-continuous-wave light has a repetition rate greater than about 10 kHz.

83. The light source of claim 80, wherein at least one of said two or more light-generating devices is a multi-mode laser.

84. The light source of claim 83, wherein said laser is a Nd:YAG laser.

85. The light source of claim 80, wherein at least one of said two or more light-generating devices is a laser diode.

86. The light source of claim 80, wherein at least one of said two or more light-generating devices produces tunable light.

87. The light source of claim 80, wherein said optical fiber amplifier is a Yb-doped, tapered fiber amplifier.

88. The light source of claim 80, wherein said optical fiber amplifier includes at least one pump laser with an output of near 915 nm.

89. The light source of claim 80, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, and wherein said OPO is singly resonant at the wavelength of either said signal beam or of said idler beam.

90. The light source of claim 80, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, and wherein said OPO is doubly resonant at the wavelength of said signal beam and at the wavelength of said idler beam.

91. The light source of claim 80, wherein said OPO, having accepted said amplified light, generates a signal beam and an idler beam, further including optics to provide said idler beam as said adjustable wavelength output.

92. A backscatter absorption gas imaging system for imaging a gas between the system and a scene, comprising:

a light source to provide illumination for a scene for a backscatter absorption gas imaging system comprising

a diode-pumped fiber laser producing an output of light at more than one wavelength, where said diode-pumped fiber laser is an air-cooled laser, and where said output varies with temperature, and

a nonlinear frequency converter including an optical parametric oscillator (OPO) to accept said output and generate an output of the light source at wavelengths shifted from and corresponding to each of said more than one wavelength; and

a camera responsive to backscattered illumination by said light source.

where said diode-pumped fiber laser is sufficiently air-cooled to provide an output that varies by no more than 10% over an ambient temperature range of from about 0 C to about 40 C.